**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-17 (Canceled without prejudice)

18. (New) A method of calibrating a mobile station location system in a cellular telecommunications network, the method comprising the steps of:

determining a position ($z_{k0}$) of a mobile station in the telecommunications network assuming no bias error;

deriving, concurrently, an approximation of the position ($z_k$) of a $k_{th}$ mobile station as a function of an n-dimensional vector ($b$) of unknown biases according to a calibration bias estimation equation

$$b = b_0 - \{\sum_{k=1}^{N} H_k^T P_k^{-1} H_k - \sum_{k=1}^{N} (H_k^T P_k^{-1} G_k (G_k P_k^{-1} G_k)^{-1} G_k^T P_k^{-1} H_k)\}^{-1} (\sum_{k=1}^{N} H_k^T P_{k-1} (Y_k - r(z_{k0}, b_0)))$$

wherein $b$ is an updated estimate of $b_0$, $b_0$ is the apriori value of a bias vector, $Y_k$ is a generic m-dimensional measurement related to the $k_{th}$ mobile station, $z_k$ is the position of the $k_{th}$ mobile station represented by the column vector (xy), $H_k$ is a derivative of $r(z,b)$ with respect to bias and $G_k$ is a derivative of the function of $r(z,b)$ with respect to position; and

refining the position ($z_{k0}$) of the mobile station, using the updated estimate of $b$, according to the equation

$$Y_k = r(z_k, b) + e_k$$

where $k = 1,\ldots,N$, and $e_k$ is an additive noise term with covariance $P_k$.

19. (New) The method of claim 18, wherein the step of deriving an approximation of the position ($z_k$) of a $k_{th}$ mobile station as a function of an n-dimensional vector ($b$) of unknown biases further comprises the step of

selecting $z_k$ to minimize loss function $V(z_k, b_0)$, wherein $z_{ko}$ satisfies $V'(z_{k0}, b_0) = 0$.

20. (New) The method of claim 19 wherein the n-dimensional vector ($b$) is calculated for multiple mobile stations.

21. (New) The method of claim 20, wherein the calculated value of $b$ of the multiple mobile stations is fed to a position calculation function (PCF) for improving the accuracy of the bias parameters used for determining a refined position of a target mobile station.

22. (New) The method of claim 21, further comprising the steps of

sending the calculated value of $b$ of the multiple mobile stations to a timing calibration function and the position ($z_{k0}$) of the mobile station to the position calculation function;

the timing calibration function performing calibration bias estimation; and

forwarding the results to the position calculation function for inclusion in computing the refined position of the target mobile station.

23. (New) The method of claim 18 wherein the mobile station location system is a time of arrival mobile station location system.

24. (New) The method of claim 18 wherein the mobile station location system is an angle of arrival mobile station location system.

25. (New) The method of claim 18, further comprising the step of the mobile station performing the necessary measurements for computing the original estimate of the position of the mobile station.

26. (New) A system for calibrating a mobile station location system in a cellular telecommunications network, the system comprising:

means for determining a position ($z_{k0}$) of a mobile station in the telecommunications network assuming no bias error;

means for deriving, concurrently, an approximation of the position ($z_k$) of a $k_{th}$ mobile station as a function of an n-dimensional vector ($b$) of unknown biases according to a calibration bias estimation equation

$$b = b_0 - \{\sum_{k=1}^{N} H_k^T P_k^{-1} H_k - \sum_{k=1}^{N} (H_k^T P_k^{-1} G_k (G_k P_k^{-1} G_k)^{-1} G_k^T P_k^{-1} H_k)\}^{-1} (\sum_{k=1}^{N} H_k^T P_{k-1} (Y_k - r(z_{k0}, b_0)))$$

wherein $b$ is an updated estimate of $b_0$, $b_0$ is the apriori value of a bias vector, $Y_k$ is a generic m-dimensional measurement related to the $k_{th}$ mobile station, $z_k$ is the position of the $k_{th}$ mobile station represented by the column vector (xy), $H_k$ is a derivative of $r(z,b)$ with respect to bias and $G_k$ is a derivative of the function of $r(z,b)$ with respect to position; and

means for refining the position ($z_{k0}$) of the mobile station using the updated estimate of $b$, according to the equation

$$Y_k = r(z_k, b) + e_k$$

where $k = 1,\ldots,N$, and $e_k$ is an additive noise term with covariance $P_k$.

27. (New) The system of claim 26, wherein the means for deriving an approximation of the position ($z_k$) of a $k_{th}$ mobile station as a function of an n-dimensional vector ($b$) of unknown biases further comprises

means for selecting $z_k$ to minimize loss function designated $V(z_k, b_0)$, wherein $z_{k0}$ satisfies $V'(z_{k0}, b_0) = 0$.

28. (New) The system of claim 27 wherein the n-dimensional vector (*b*) is calculated for multiple mobile stations.

29. (New) The system of claim 28, further comprising means for sending the calculated value of *b* of the multiple mobile stations to

a position calculation function (PCF) for improving the accuracy of the bias parameters used for determining the refined position of a target mobile station.

30. (New) The system of claim 29, further comprising:

means for sending the calculated value of *b* of the multiple mobile stations to a timing calibration function and for sending the position ($z_{k0}$) of the mobile station to the position calculation function;

the timing calibration function performing calibration bias estimation and forwarding the results to the position calculation function for inclusion in computing the refined position of the target mobile station.

31. (New) The system of claim 26 wherein the mobile station location system is a time of arrival mobile station location system.

32. (New) The system of claim 26 wherein the mobile station location system is an angle of arrival mobile station location system.

33. (New) The system of claim 26, wherein the mobile station performs the necessary measurements for computing the original estimate of the position of the mobile station.